



RESEARCH AND CO DESIGN OF STREET URINALS FOR MALE AND FEMALE USERS IN SUPPORT OF THE WRC URINE HARVESTING AND PROCESSING PROJECT

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1. Introduction

The NPO Asiye eTafuleni [AeT] was established in 2008 and is located in Warwick Junction, Durban. AeT works alongside informal workers who utilize public spaces for their livelihoods – typically street and market vendors, waste reclaimers and non-motorized transport operators [barrows and carts]. Notwithstanding the local authority sanctioning many of these activities, the workers experience harsh enforcement, poor maintenance of infrastructure and diminished urban management. As a consequence, a challenge is the complete lack of functioning public toilets. It is estimated that approximately 400 000 commuters travers Warwick Junction daily, in addition to the approximately 6000 informal workers, which highlights the magnitude of this challenge. The urban management consequence of the lack of public toilets is primarily public urination. This has multiple negative impacts, but chiefly, health and economic – the latter as a result of diminished income earning public space due to urine pollution.

Over the last 4 years AeT has become increasingly involved in zero waste and climate change funded projects. As an aspect of the former, human waste was a focus and urine harvesting the latter.

AeT observed that some community conscious workers were deploying the most basic solutions in an attempt to manage pervasive public urination and that regardless of methods, if these initiatives could be supported there could be potential for sustainable community driven infrastructure and management.

2. Objectives

The community conscious solutions were essentially buckets placed in the most urine polluted locations in the public space. The buckets / containers were either because of the offence or because the urine pollution was undermining informal trading activities ie. having an economic impact. Establishing and maintaining the collection points was based on volunteerism, however in some instances the ‘operators’ encouraged users to contribute R2.00 / use for the rudimentary service. This has a moderate level of

acceptance. Clearly, the location of the collection points was not near a sewer outlet, hence the buckets / containers were disposed kerbside into the stormwater reticulation.

Males felt unconstrained to urinate in public, whilst females shrouded themselves with clothes / blankets for privacy and utilized small containers which were similarly disposed kerbside. AeT observed this rudimentary and pragmatic response and believed that with incisive infrastructure design and urine collection interventions an endemic urban management and sustainable response was achievable.

The following objectives have evolved:

2.1 Public urination a priority

The lack of public toilets is creating an unmanageable challenge of public defecation and urination. The former is significant but more discrete, whilst the latter is pervasive and noticeably degrading the public environment. In addition, there is a direct relationship between a urine infested public space and public safety.

2.2 Creative and robust infrastructure

Notwithstanding the rudimentary community interventions to manage public urination, the solutions adopted suggested both the elemental design and pragmatic use. The buckets / containers were of minimal cost and of no theft / salvageable value. Equally, despite there being seemingly diminished privacy when males utilized the collection points, both observation and research indicates that surveillance safety from mugging / theft / assault is a paramount requirement. In addition, the incidents where collection points have provided more privacy or seclusion, these locations have been used for defecation.

The principle of co-design has been adopted to inform site location; material selection, community opinion regarding privacy for both users and passing public.

2.3 Clear distinction between male and female user requirements.

Recognizing that observing males urinating at a street urinal is not preferable, the urban management functionality and urban safety is deemed a significant preference. However, for females the need for privacy is obvious and necessary. The core function of the female street urinal remains a facility for urination not defecating. The design solution therefore requires a similar but different detail design response that heightens awareness that the enclosure is not a conventional toilet but designated for urination. AeT has accepted that this might result functional compromise – just as in the case for males.

2.4 Community adoption and support

In the absence of the local authority providing and maintaining prerequisite public toilets, the Warwick Junction community has demonstrated that they can and will intervene in the face of the challenge. However, if the urban aesthetic of the collection points is to be significantly improved, user privacy dignified and the distinct gender use difference recognized, then deliberate design expertise is required to support evident community volunteerism. AeT believes this needs to be implemented on a co-design basis with those community members who have already shown commitment and implemented their own collection points. The collection points in themselves have a pre-identified and functional logic.

2.5 Sustainable income source

Sustaining a collection point requires resources appropriate to the infrastructure re its acquisition and its maintenance. Item 2.4 above implies that the incisiveness and responsiveness of the co-design is critical in relation to the infrastructure. However, the disposal of the urine off-grid or in the absence of a functional sewer requires an informal income and financial support for basic cleaning. Notionally the community recognizes that a monetary contribution should be made,

however this is not enforceable. So, the prospect of harvesting the urine to realize a commercial monetary value could provide a compensatory return to an informal worker to adopt a street urinal as a source of an informal income. This together with the ad hoc donations could prove sufficient income to sustain the street urinals.

2.6 Pinnacle objective

This initiative is at the intersect between climate mitigation and urban management. The former is the extraction of the primarily nitrogen for agri-fertilizer – the dual benefit being climate mitigation and soil nurture. However, the co-benefit is that the pervasive presence of urine in public spaces is a stubborn management challenge that could be addressed by pro-actively collecting the urine. The dignified collection of the urine would ameliorate degraded public spaces and have potentially positive informal economy outcomes ie enhanced street trading opportunities and urine collection stipends.

AeT has been collaborating with various partners for the extraction of the urine nutrients utilizing the VUNA technology.

See <https://washcentre.ukzn.ac.za/vuna-project/>

3. Participatory Action Research and Co Design

3.1 Observed street responses vs designed response.

AeT undertook a detailed survey of the community responses to urination. This commenced in 2023 and has been ongoing. The street locations have been mapped and the circumstances that have initiated the responses / locations. Of particular importance has been the individuals who have initiated the placement of the containers and how the process is being maintained. A common

occurrence is that users leave a ZAR 2.00 donation as a contribution towards the service.

AeT recognized that in many instances the bucket / container was the incremental low-cost initiative. This resulted in AeT's direct design response to improve the elemental 'bucket'. This was co-designed with the current operators of bucket locations and became known as the IBP [Improved Bucket Pissoir]. An operating challenge [specific to the IBP but applicable generally] is that the most affordable and readily available disinfectant is carbolic [black] Jeyes fluid which causes an indelible staining of the bucket and pipe work. This results in an unsightly appearance over time.

3.2 Wooden to Metal Cage Urinal progression on David Webster Street

In Warwick Junction, the David Webster Street corner presented a significant challenge because of public urination. This was a direct result of the local authority public toilets located on this corner being dysfunctional and inoperative for at least 5 years. The intervention in this location required a response at the scale beyond buckets / containers resulting in the first pilot street urinal. The photographic record demonstrates the progression from the initial wooden structure with a recycled trough to the use of a recycled metal cage from a 1000 L flex-tank [typically used by industry]. Both co-designs utilized the principle of low-cost, a no salvage value selection of materials and commencing to pilot the harvesting of the urine. In addition, the operating of the facility was by an AeT Waste Champion – a frontline zero waste community volunteer who undertook the oversight as his outreach project. Users were willing to leave a ZAR 2.00 donation for the use of the service.

A significant outcome was the dramatic improvement in the urban environment which in turn resulted in some street vendors returning to their vacated trading site because of the now tenable environment.

3.3 Installation of Street Urinals.

The positive community response to the David Webster pilots soon generated requests from various other locations in Warwick Junction – some new locations and others ‘up grades’ from bucket installations. The design was modified in some instances to respond to specific site conditions – in particular, narrow sidewalks. Various iterations of the urine trough have been implemented over time. Notable in all instances has been the pride and commitment demonstrated by the ‘operators’ of the facilities, ranging from street vendors to homeless individuals who have self-created a livelihood from the street urinals.

A perceived criticism of the male street urinal is the seeming exposure of individuals when using the facility. This is a reality, but the design ensures essential modesty but the openness of the structure is deemed its distinction, because it provides heightened urban safety. This has been confirmed by observation, anecdotal and in the questionnaire responses – especially from the elderly.

3.4 Asiye eTafuleni Street Urinal.

AeT has progressively continued with the co-design and management models for the street urinals. This has resulted in design modifications, but always with the intention of seeding ideas that could be replicated by the community – in this instance, recycled plastic pallets, secured with heavy duty cable ties and the evolving design of the trough. AeT believes there are now at least 11 active sheet urinals located in Warwick Junction. One location is estimated to support 250 users a day producing 700 L of urine. The urine harvesting model is currently being negotiated with the operators. The intention is to collect the urine in manageable quantities from the various street urinals and manually transport this with informal conveyances to a convenient bulk storage, for transfer to the procession plant currently being piloted under the WRC funded grant. The financial model for the processing

imagines that provision exists for an informal livelihood stipend to collect and transfer the harvested urine.

3.5 Female Street Urinal Co-design Concept Presentation and Pioneer Prototype.

Working in conjunction with development of the male street urinals, has been recognition that similar provision needs to be made for women. Research work currently being undertaken by AeT on climate change and health, indicates that women are most at risk from long-term kidney and liver disease because of a lack of hydration during extreme heat – clearly because of limited opportunities to urinate [after hydration]. The obvious and distinct design difference is the need for privacy. In the absence of any facilities, the women deploy discreet methods to urinate in public using small containers whilst shrouded with shawls / blankets. If a street cubicle were to be provided it presents 2 challenges – that it be used as a ‘regular’ toilet for defecation, not just urination and that at night the facility would be vandalized / abused. The solution that has evolved are various iterations of a fold-down / pack-away amenity that still respects the women’s preference to use individual containers for urination but to enable the containers to be discreetly emptied within the cubicle [and to the collection container].

The illustrated sheet demonstrates the co-design tools / techniques and the resultant first full-size pilot.

This pilot initiative is operated and managed by a specific group of women [approximately 12] who have been the co-design contributors on all aspects towards the next pilot iteration.

3.6 Asiye eTafuleni Male Street Urinal [Prototype]

The illustrated sheet demonstrates the current outcome of this development process which has prospect to be replicated at scale.

3.7 Asiye eTafuleni Female Street Urinal

The illustrated sheet demonstrates the current outcome of this development process which also has prospect to be replicated at scale.

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